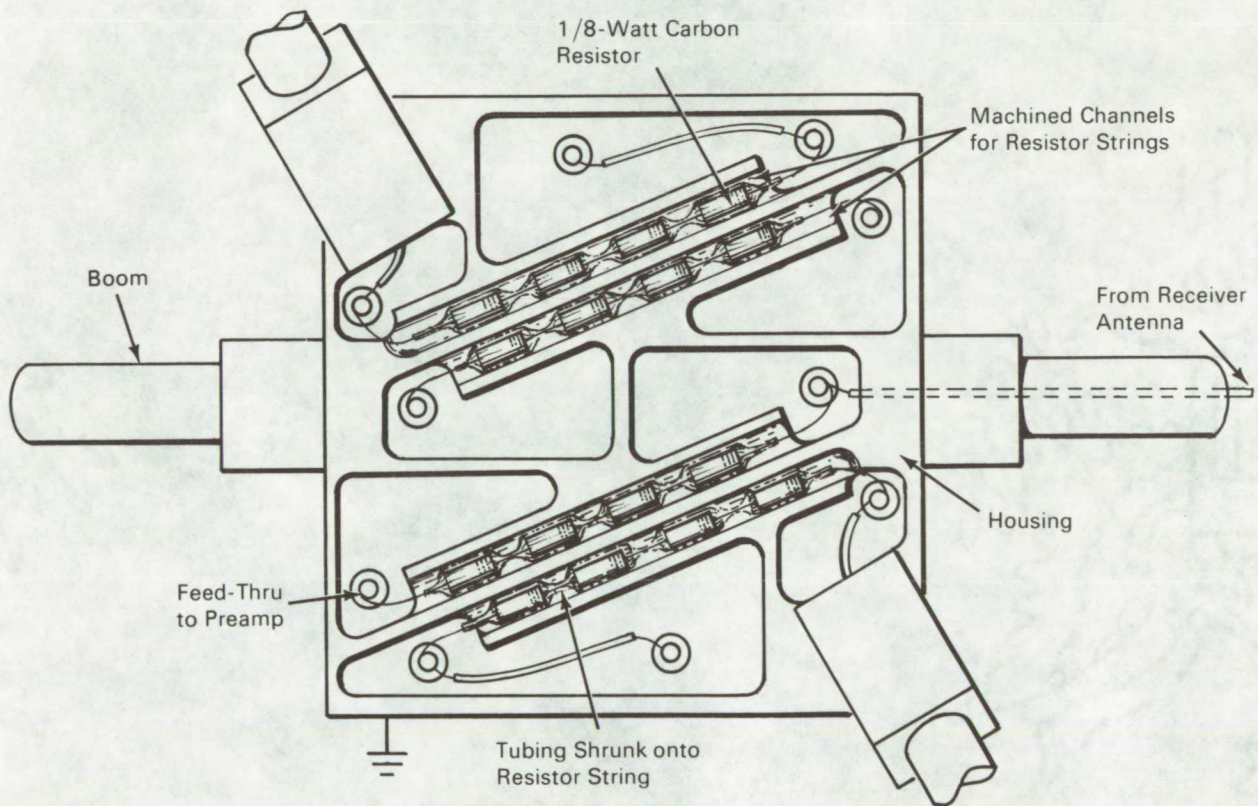


NASA TECH BRIEF



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RC Filter With Low Distributed Capacitance Provides 60 DB Isolation at 500 MHZ



The problem:

A high input impedance receiver preamplifier located near an rf transmitter must be isolated from the transmitted signal. A conventional inductive-capacitive filter, which has an inherent high shunt capacitance, is not practical since the source impedance (the receiver antenna) is very high, e.g., in the range of 10^5 to 10^9 ohms for satellite-borne VLF receivers.

The solution:

A resistance-capacitance RC filter coupled to the preamplifier input provides a signal isolation (attenuation) greater than 60 dB. The high isolation is achieved by minimizing the inductive impedance to ground and using the distributed capacitance of the filter components.

(continued overleaf)

How it's done:

The distributive RC filter is constructed with four 1/8-watt carbon resistors connected in series with very short lead lengths (see figure). A thin insulating material such as shrinkable tubing is placed over the resistors. The entire assembly is mounted inside a channel that is milled out of the preamplifier housing. For a channel dimension of 0.08-in. diam and 1.25-in. length, the total input shunt capacitance is approximately 5 pF. The cutoff frequency of the RC filter, for these dimensions and with 50 k ohm resistors, begins at 200 kHz. Isolation in excess of 60 dB has been achieved for carrier frequencies of 10 MHz to 500 MHz.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Code 207.1
Greenbelt, Maryland 20771
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Patent status:

No patent action is contemplated by NASA.

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